Docket 82662CPK
Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	Group Art Unit: 1774
Yongcai Wang, et al	Examiner: Pamela R. Schwartz
INK JET RECORDING ELEMENT	
Serial No. 10/021,341	
Filed 12 December 2001	

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APPEAL BRIEF PURSUANT TO 37 C.F.R. 41.37 and 35 U.S.C. 134

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APPELLANT'S BRIEF ON APPEAL

Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of claims 1, 8-11, 14, 15, 17, and 18 which was contained in the Office Action mailed April 19, 2007.

A timely Notice of Appeal was filed September 19, 2007.

Real Party In Interest

As indicated above in the caption of the Brief, the Eastman Kodak Company is the real party in interest.

Related Appeals And Interferences

No appeals or interferences are known which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

Status Of The Claims

Claims 1- 20 have been pending. Claims 2-7, 12-13, 16, and 19-20 have been canceled. Claim 18 has been withdrawn. Claims 1, 8, 9, 11, 14-15 are under final rejection. No claims have been objected to or have been allowed.

Appendix I provides a clean, double spaced copy of the claims on appeal.

Status Of Amendments

There were no amendments after final. All amendments have been entered.

Summary of Claimed Subject Matter

The invention is directed to an ink jet recording element comprising a support having thereon an image-receiving layer having a thickness of 5 to 20 microns and, between said support and said image-receiving layer, a base layer having a thickness of 20 to 50 microns, both layers comprising inorganic particles and stabilizer particles in an amount of from about 10 mg/m^2 to about 5 g/m^2, said stabilizer particles being free of any organic solvent and comprising greater than about 80% by weight of a water-insoluble antioxidant and having a mean particle size of greater than about 5 nm to 500 nm, said inorganic particles comprising

greater than about 50% by weight of said image-receiving layer and of said base layer, wherein greater than 50% by weight of said base layer comprises inorganic particles consisting of precipitated calcium carbonate and silica gel, and wherein the base layer also contains binder in the amount of from about 5 to about 20 weight percent, and wherein greater than 50% by weight of the image-receiving layer consist of inorganic particles selected from the group consisting of fumed silica, colloidal silica, fumed alumina, colloidal alumina, and pseudo-boehmite and wherein the inorganic particles in the image-receiving layer have a mean particle size of 50 nm to 500 nm, wherein the coating thickness of the image-receiving layer is determined such that the image-receiving layer holds ink near the surface of the image-receiving layer, above the base layer, when ink in a solvent is applied to the ink jet recording element by an ink jet printer.

The invention is described on page 3, lines 9-15; page 4, line 22 to page 5, line 7; and page 15, line 24, to page 16, line 2.

Grounds of Rejection to be Reviewed on Appeal

The following issues are presented for review by the Board of Patent Appeals and Interferences:

1. Whether claims 1, 8, 9, 11, 14-15, and 17 are unpatentable over Kitamura et al. taken alone or in view of Saito et al. or Cuch et al. under 35 U.S.C. §103(a)?

2. Whether claims 1 and 10 are unpatentable over Kitamura et al. taken alone or in view of Saito et al. or Cuch et al., and further in view of Chu e al. under 35 U.S.C. §103(a)?

Arguments

Claims 1, 8, 9, 11, 14-15, and 17 are patentable under 35 U.S.C. §103(a) over Kitamura et al. taken alone or in view of Saito et al. or Cuch et al.

Claims 1, 8, 9, 11, and 14-15

The Examiner states that Kitamura et al. disclose an ink jet recording material comprising one or more ink receiving layers on a support (p. 3, lines 43-50), the ink receiving layers including colloidal pigment particles (that may be of colloidal silica and have an average particles size of 10 to 300 nm) and an ultraviolet ray absorber. The Examiner states that the UV absorber is present in an amount of 0.25 to 25 parts by weight per 100 parts of the total amount of pigment (p. 5, lines 22-24). The Examiner further states that the ink receiving layer(s) may also contain an antioxidant which is present in an amount of 1 to 10,000 parts by weight by 100 parts UV absorber (p. 5, lines 53-57) and that the antioxidants may be phenolic or sulfur containing, among others (p. 6, lines 3-44). The Examiner notes that the antioxidants may be used as a water insoluble powder or as an emulsion, have an average particle size of 500 nm or less, and be used in an amount from 0.5 to 25 parts by weight per 100 parts by weight of the pigment. The Examiner further notes that the materials are mixed with binder and other additives (p. 6, line 45 to p. 7, line 23), the binder may be a water-soluble polymer or a latex polymer, and the binder is present in an amount of preferably 5 to 100 parts by solid weight to 100 parts by weight of the pigment. The Examiner states that, using the ratios set forth above, pigment, binder and antioxidant may be present in the amounts set forth by the instant claims.

The Examiner adds that the reference also discloses that dispersants may be present. The Examiner states that it would have been obvious to use known additives such as a dispersant in quantity necessary to properly disperse the materials. The Examiner further states that the prior art discloses the use of either one ink-receiving layer or two such layers.

The secondary references are cited merely to show that calcium carbonate *per se* has been used in inkjet recording materials.

The Examiner's analysis is correct up to a point. Kitamura et al. teach two things:

(1) the presence of stabilizer particles comprising water-insoluble antioxidant in an ink receiving layer comprising inorganic particles; and

(2) multiple ink receiving layers that can include an image receiving layer and a sump layer.

However, Kitamura et al. do not teach, in the case of two ink-receiving layers, to have stabilizer particles present in both of the layers. Not only does Kitamura et al. not teach this but, in fact, Kitamura et al. teach away from this concept. On page 8, paragraph [0062], Kitamura et al. state "The additional ink receiving layer which may contain no ultraviolet ray absorber is preferably formed in a weight of 1 to 50 g/m^2...." (The clear implication, of course, is that it contain no antioxidant as well.) In fact, Example II-1 and Example II-2 of Kitamura et al. teach a single ink receiving layer containing UV absorber and antioxidant, but when two ink receiving layers are used, as in Example II-8, the "base layer" having a dry weight of 15 g/m^2, does not contain UV absorber or antioxidant.

Applicants' interpretation of Kitamura et al. is consistent with the rest of the disclosure of Kitamura et al. In paragraph [0039], for example, Kitamura et al. state: "In a preferred embodiment of the present invention, to further enhance the light resistance, the ink receiving layer further contains an antioxidant." [Emphasis added.] Kitamura et al. never refer to antioxidant being in the ink receiving layers. Nor does Kitamura say that if two ink receiving layers are used, they have the same composition. For example, in paragraph [0052], Kitamura et al. state as follows:

> For the purpose of enhancing the ink-fixing property of the ink receiving layer, a cationic compound may be contained in the ink receiving layer. ...Also, when the ink receiving layer has a multiple layered structure, the outermost ink receiving layer on which the ink jet printing is applied preferably contains the cationic compound.

Hence, the Examiner is quite wrong in the conclusion, clearly vitiated by the Examples in Kitamura itself, that because Kitamura et al.

teach placing a specific component in a single (outermost) ink receiving layer, they teach, in the case of multiple layers, placing it in a lower, additional layer, particularly a base layer, which is typically designed for critically different functions than an uppermost image-receiving layer.

Applicants' interpretation of Kitamura et al. is also supported by the limitations on the amount of the ink receiving layers, whether in microns (μm) or in g/m^2. (As a rough rule of thumb, 1 μm may be considered to be about 1 g/m^2.) As required by the present invention, the base layer begins and extends significantly below the top surface of the inkjet recording element. The image-receiving layer holds ink near the surface of the image-receiving layer to form the image, away from the base layer. There is only a single image, so it cannot be both in the image-receiving layer and the base layer. Similarly, Kitamura et al. state (in paragraph [0061]) as follows:

> When the ink receiving layer consists of a single principal ink receiving layer, usually the ink receiving layer is preferably formed in an amount of 3 to 60 g/m^2, more preferably 10 to 50 g/m^2. When the ink receiving layer has a multiple layered structure, the principle ink receiving layer containing the ultraviolet ray absorber [and implicitly the optional antioxidant] and preferably arranged to form an outermost layer is preferably formed in an amount of 1 to 30 g/m^2....When the principle ink receiving layer amount is too high, the light resistance effect may be saturated.

In other words, Kitamura et al. state that the concern for light resistance is only relevant to the outermost ink receiving layer and, even then, only to a limited thickness or depth of the outermost layer. In fact, the middle values of the above recited more preferred ranges in Kitamura et al. match Applicants' ranges quite well. Similarly, the thickness of the layers in the Examples of Kitamura et al. fairly well match the thickness of the layers in the present invention, supporting the view that the additional ink receiving layers in Kitamura would not be an image-receiving layer that would be in need of light resistance according to Kitamura et al. themselves.

In addition, the Applicants wish to point out that Claim 1 specifically and crucially recites that both the image-receiving layer and the base layer, between the support and the image-receiving layer, have inorganic particles and stabilizer particles, which stabilizer particles are free of any organic solvent and comprised greater than about 80% by weight of a water-insoluble antioxidant, and have a mean particle size of greater than about 5 nm. Furthermore, the present base layer is not an image-receiving layer. The image-receiving layer is intended to hold the dye and, in order to accomplish this, can contain a dye-fixing agent or other material, such that the associated characteristics result in the colorant in the ink being held near the coating surface. A base layer is typically used primarily to act as a sump for absorption of the solvent for the ink and is not designed to hold the image.

Applicants have pointed out, during prosecution, that the skilled artisan would appreciate that a layer characterized as a base layer is not used as an image-receiving layer, that all layers are not merely interchangeable based on loose wording to be found in one of thousands of patents in the art. For example, In addition, Applicants have pointed out that the thickness of a base layer is designed, not for imaging with dye, but for use as a sump for the solvent in applied ink during printing.

The Examiner states that unless a definition is set forth by Applicants' specification, the term (base layer) will be given its usual and broadest meaning in the art. The Examiner has studied the art and believes the term "base layer" to indicate any layer near the support that has other layers over it. The Examiner concludes, therefore, that the claimed base layer reads on an additional image-receiving layer of the primary reference. The Examiner further argues that, although Applicants state that a base layer is intended to serve as an additional sump for the ink solvent, the additional image-receiving layer of the reference would serve this function.

In view of the above, it is submitted that the skilled artisan would not find it obvious to place the given stabilizer particles in the base layer in addition to the image-receiving layer or layers. A key factor in the patentability of the invention

is the experimental data in the examples in the present application. As evident by Applicants' examples, the composition of the base layer (page 20) is significantly different from the composition of the image-receiving layer (page 21). Moreover, as stated on pages 21-22, the base layer has a dry thickness of 25 μm whereas the image-receiving layer gave a dry thickness of 8 μm. Clearly, Applicants' base layer is not a second image-receiving layer.

In considering the examples, in both Kitamura et al. and the present invention, important distinctions are supported by considerable evidence. Kitamura et al. require an ultraviolet ray absorber, but the antioxidant is considered optional. Comparing, in the Kitamura et al. patent, Table 1 (page 16) showing results for image-receiving layers with a UV absorber but no antioxidant (Examples I-1 to I-11) to Table 2 (page 22) showing results for image-receiving layers with both a UV absorber and an antioxidant, it is apparent that the fading rates are somewhat better with the addition of the antioxidant, but that most of the improvement is due to the UV absorber. In contrast, in the present invention, by having the antioxidant in both the image-receiving layer and the base layer, there is a relatively dramatic improvement in fading rates and density loss without any UV absorber. See the present specification for improvements of more than 50% in both Table 1 for ambient light fade, and improvements of around 50% for density loss in both Table 2 and 3. The use in the present invention of stabilizer particles (essentially without UV absorber) in both a base layer and the image-receiving layer, would appear to provide dye fade and dye density improvement that, based on the results in Kitamura et al., is comparable to the use of both stabilizer and UV absorber only in an image receiving layer. Avoiding the amounts of UV absorber used in Kitamura et al. provides a significant advantage, since UV absorbers are somewhat colored species that can degrade and cause discoloration or yellowing.

It should also be noted that UV absorbers and stabilizer particles act on different environmental conditions, so that the Examiner's allegation that what the prior art teaches with respect to a UV absorber, the prior art teaches with respect to a stabilizer particle is incorrect. UV absorbers are relevant to light fade, whereas stabilizer particles are relevant primarily to ozone fade. Ozone may not go where light goes and vice versa and may have different effects. The relative significance

of ozone fade and light fade can depend on the composition of the layers of a particular inkjet recording element. The development of a new inkjet recording element must take all such factors into consideration and, hence, not being remotely predictable in theory, substantial amounts of empirical testing is required to obtain the best overall properties of the inkjet recording media being developed for use, for example, in photographic quality prints which must meet high standards of image quality.

Claim 17

Furthermore, with respect to dependent claim 17, the image-receiving layer has no UV absorbers for preventing light fade. In contrast, Kitamura et al., as mentioned above, require an ultraviolet ray absorber, but the antioxidant is considered optional. Comparing, in the Kitamura et al. patent, Table 1 (page 16) showing results for image-receiving layers with a UV absorber but no antioxidant (Examples I-1 to I-11) to Table 2 (page 22) showing results for image-receiving layers with both a UV absorber and an antioxidant, it is apparent that the fading rates are somewhat better with the addition of the antioxidant, but that most of the improvement is due to the UV absorber. In contrast, in the present invention, by having the antioxidant in both the image-receiving layer and the base layer, there is a relatively dramatic improvement in fading rates and density loss without any UV absorber. Also, as pointed out above, avoiding the amounts of UV absorber used in Kitamura et al. provides a significant advantage, since UV absorbers are somewhat colored species that can degrade and cause discoloration or yellowing.

Rejection Of Claims 1 and 10 Under 35 U.S.C. §103(a):

Claims 1 and 10

Claims 1 and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kitamura et al. taken alone or in view of Saito et al. or Cuch et al., and further in view of Chu e al.

Chu et al. (6,440,537) is additionally cited for teaching a core/shell latex. The Examiner states that Chu et al. teach an ink jet recording medium

including core/shell latex particles as instantly claimed. The addition of the core-shell particles is a secondary feature of the invention and does not relate to the main purpose of the invention which is to prevent light fade or provide increased image density. Since claim 10 is directed a secondary feature of the invention, that in claim 10, claim 1 is patentable for the reasons cited above, in with respect to the first rejection. Consequently, Claim 10 will stand or fall with Claim 1.

Summary

In view of the above, it is respectfully submitted that Claims 1, 8, 9, 11, 14-15, and 17 are patentable under 35 U.S.C. §103(a) over Kitamura et al. taken alone or in view of Saito et al. or Cuch et al. Also, Claims 1 and 10 are patentable under 35 U.S.C. §103(a) over Kitamura et al. taken alone or in view of Saito et al. or Cuch et al., and further in view of Chu e al.

Conclusion

For the above reasons, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the rejection by the Examiner and mandate the allowance of Claims 1, 8-11, 14, 15, 17, and 18.

Respectfully submitted,

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Enclosures

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.

Appendix I - Claims on Appeal

1. (previously presented) An ink jet recording element comprising a support having thereon an image-receiving layer having a thickness of 5 to 20 microns and, between said support and said image-receiving layer, a base layer having a thickness of 20 to 50 microns, both layers comprising inorganic particles and stabilizer particles in an amount of from about 10 mg/m^2 to about 5 g/m^2, said stabilizer particles being free of any organic solvent and comprising greater than about 80% by weight of a water-insoluble antioxidant and having a mean particle size of greater than about 5 nm to 500 nm, said inorganic particles comprising greater than about 50% by weight of said image-receiving layer and of said base layer, wherein greater than 50% by weight of said base layer comprises inorganic particles consisting of precipitated calcium carbonate and silica gel, and wherein the base layer also contains binder in the amount of from about 5 to about 20 weight percent, and wherein greater than 50% by weight of the image-receiving layer consist of inorganic particles selected from the group consisting of fumed silica, colloidal silica, fumed alumina, colloidal alumina, and pseudo-boehmite and wherein the inorganic particles in the image-receiving layer have a mean particle size of 50 nm to 500 nm, wherein the coating thickness of the image-receiving layer is determined such that the image-receiving layer holds ink near the surface of the image-receiving layer, above the base layer, when ink in a solvent is applied to the ink jet recording element by an ink jet printer.

Claims 2-7 (canceled)

8. (previously presented) The recording element of Claim 1 wherein said image-receiving layer also contains a binder in an amount of from about 5 to about 20 weight %.

9. (previously presented) The recording element of Claim 8 wherein said binder is a hydrophilic polymer.

10. (previously presented) The recording element of Claim 8 wherein said binder is a core/shell latex.

11. (previously presented) The recording element of Claim 1 wherein said antioxidant comprises a substituted phenol, aromatic amine, piperidine-based amine, mercaptan, organic sulfide or organic phosphate.

12. (canceled)

13. (canceled)

14. (previously presented) The recording element of Claim 1 wherein said stabilizer particle also contains a dispersant or surfactant.

15. (previously presented) The recording element of Claim 14 wherein said dispersant or surfactant is present in said stabilizer particle up to about 20% by weight.

16. (Canceled)

17. (previously presented) The recording element of claim 1 wherein the image-receiving layer has no UV absorbers for preventing light fade.

18. (withdrawn) An ink jet printing method comprising the **steps of:**

A) providing an ink jet printer;

B) providing said printer with an ink jet recording element comprising a support having thereon an image-receiving layer, having a thickness of 5 to 20 μm, for holding the ink near the layer's outer surface and acting as a sump for absorption of ink solvent and, between said support and said image-receiving layer, a base layer having a thickness of about 20 to 50 μm, both layers comprising inorganic particles, having a mean particle size of from about 50 to 500 nm, and stabilizer particles in an amount of from about 10 mg/m^2 to about 5 g/m^2 and having a mean particle size of from about 5 to 500 nm, said stabilizer particles being free of any organic solvent and comprising greater than about 80% by weight of a water-insoluble antioxidant and having a mean particle size of greater than about 5 nm, said inorganic particles comprising greater than about 50% by weight of said image-receiving layer and of said base layer;

C) providing said printer with an ink jet ink composition;

and

D) printing on said image-receiving layer using said ink jet ink composition.

Claims 19-20. (canceled)

Appendix II - Evidence

None.

Appendix III – Related Proceedings

None.